WHAT IS CLAIMED IS:

1. A method for distinguishing between single-stranded DNA viruses, double-stranded DNA viruses and RNA viruses present in a biological sample containing viruses, which comprises

contacting dyes which can distinguish between said viruses with viruses in said sample,

concentrating said viruses by i) adding a sample containing said viruses to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said viruses, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having a decreasing diameter from said upper region toward said lower region and wherein said lower region has a closed bottom, and

detecting the bound dyes in a band of virus, whereby the type of nucleic acid present in the viruses is determined.

2. The ultracentrifuge tube of claim 1, wherein said middle region comprises one or more serrations.

3. The ultracentifuge tube of claim 1, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

4. The method of claim 1, wherein said dyes are added to said sample.

5. The method of claim 1, wherein such dyes are added to a layer of fluid added to the tube before the addition of said sample and said viruses contact said dyes during centrifugation.

6. The method of claim 1, wherein said dyes are fluorescent and said bound fluorescent dyes are detected by passing an exciting fluorescent light through said band of virus and determining a wavelength of peak intensity of emitted fluorescent light from said band of virus.

7. The method of claim 6, which further comprises removing unbound dyes from said tube prior to determining said wavelength of peak intensity.

8. The method of claim 1, wherein said bound dyes are detected by passing an exciting light through said band of virus and determining the spectral distribution of the emitted light.

9. A method for determining an infectious agent titre in a biological sample, which comprises measuring the intensity of emitted fluorescent light of claim 6.

10. A method for distinguishing between single-stranded DNA viruses, double-stranded DNA viruses and RNA viruses present in a biological sample containing viruses, which comprises

contacting dyes which can distinguish between said viruses with viruses in said sample,

concentrating said viruses by i) adding a sample containing said viruses to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said viruses, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region, wherein (i) an inner diameter of said middle region is larger than an inner diameter of said lower region or (ii) the inner diameter of said middle region is the same as the inner diameter of said lower region, wherein that inner diameter is small enough to trap an air bubble between two layers of aqueous liquid such that the air bubble will keep said two layers of aqueous liquid separate so long as said centrifuge tube is at rest, and wherein said lower region has a closed bottom, and

detecting the bound dyes in a band of virus, whereby the type of nucleic acid present in the viruses is determined.

11. The method of claim 10, wherein said dyes are added to said sample.

12. The method of claim 10, wherein such dyes are added to a layer of fluid added to the tube before the addition of said sample and said viruses contact said dyes during centrifugation.

13. The method of claim 10, wherein said dyes are fluorescent and said bound fluorescent dyes are detected by passing an exciting fluorescent light through said band of virus and determining a wavelength of peak intensity of emitted fluorescent light from said band of virus.

14. The method of claim 13, which further comprises removing unbound dyes from said tube prior to determining said wavelength of peak intensity.

15. The method of claim 10, wherein said bound dyes are detected by passing an exciting light through said band of virus and determining the spectral distribution of the emitted light.

16. A method for determining an infectious agent titre in a biological sample, which comprises measuring the intensity of emitted fluorescent light of claim 13.

17. A method for distinguishing between single-stranded DNA viruses, double-stranded DNA viruses and RNA viruses present in a biological sample containing viruses, which comprises

contacting dyes which can distinguish between said viruses with viruses in said sample,

concentrating said viruses by i) adding a sample containing said viruses to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said viruses, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein said centrifuge tube comprises a linearly continuous inner surface at least partially defined by said upper, middle and lower regions, wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner diameter of said lower region and wherein said lower region has a closed bottom, and

detecting the bound dyes in a band of virus, whereby the type of nucleic acid present in the viruses is determined.

18. The ultracentrifuge tube of claim 17, wherein said middle region comprises one or more serrations.

19. The ultracentifuge tube of claim 17, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

20. The method of claim 17, wherein said dyes are added to said sample.

21. The method of claim 17, wherein such dyes are added to a layer of fluid added to the tube before the addition of said sample and said viruses contact said dyes during centrifugation.

22. The method of claim 17, wherein said dyes are fluorescent and said bound fluorescent dyes are detected by passing an exciting fluorescent light through said band of virus and determining a wavelength of peak intensity of emitted fluorescent light from said band of virus.

23. The method of claim 22, which further comprises removing unbound dyes from said tube prior to determining said wavelength of peak intensity.

24. The method of claim 17, wherein said bound dyes are detected by passing an exciting light through said band of virus and determining the spectral distribution of the emitted light.

25. A method for determining an infectious agent titre in a biological sample, which comprises measuring the intensity of emitted fluorescent light of claim 22.

26. A method for distinguishing between single-stranded DNA viruses, double-stranded DNA viruses and RNA viruses present in a biological sample containing viruses, which comprises

contacting dyes which can distinguish between said viruses with viruses in said sample,

concentrating said viruses by i) adding a sample containing said viruses to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said viruses, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner

diameter of said lower region, wherein said upper region is separated from said middle region by a first tapering region having a decreasing diameter from said upper region toward said middle region, and said middle region is separated from said lower region by a second tapering region having a decreasing diameter from said middle region toward said lower region, and

detecting the bound dyes in a band of virus, whereby the type of nucleic acid present in the viruses is determined.

27. The ultracentrifuge tube of claim 26, wherein said middle region comprises one or more serrations.

28. The ultracentifuge tube of claim 26, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

29. The method of claim 26, wherein said dyes are added to said sample.

30. The method of claim 26, wherein such dyes are added to a layer of fluid added to the tube before the addition of said sample and said viruses contact said dyes during centrifugation.

31. The method of claim 26, wherein said dyes are fluorescent and said bound fluorescent dyes are detected by passing an exciting fluorescent light through said band of virus and determining a wavelength of peak intensity of emitted fluorescent light from said band of virus.

32. The method of claim 31, which further comprises removing unbound dyes from said tube prior to determining said wavelength of peak intensity.

33. The method of claim 26, wherein said bound dyes are detected by passing an exciting light through said band of virus and determining the spectral distribution of the emitted light.

34. A method for determining an infectious agent titre in a biological sample, which comprises measuring the intensity of emitted fluorescent light of claim 31.

35. A method of determining which microorganism is present in a biological sample which contains a microorganism wherein said method comprises the steps of:

(a) concentrating said microorganism according to yield concentrated microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having a decreasing diameter from said upper region toward said lower region and wherein said lower region has a closed bottom;

(b) extracting nucleic acid from said concentrated microorganism;

(c) incubating said nucleic acid with restriction enzymes to produce nucleic acid fragments;

(d) staining said nucleic acid or nucleic acid fragments;

(e) determining a pattern of sizes of said nucleic acid fragments; and

(f) comparing said pattern of sizes with patterns of sizes of nucleic acids, digested with said restriction enzymes, obtained from known microorganisms,

wherein said microorganism in said biological sample is identified as a microorganism which has an identical restriction fragment pattern.

36. The ultracentrifuge tube of claim 35, wherein said middle region comprises one or more serrations.

37. The ultracentifuge tube of claim 35, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

38. The method of claim 35, wherein said sizes of nucleic acid molecules or fragments thereof are determined using flow cytometry.

39. The method of claim 35, wherein said sizes of nucleic acid molecules or fragments thereof are determined by gel electrophoresis.

40. The method of claim 35, wherein said sizes of nucleic acid molecules or fragments thereof are determined by mass spectrometry.

41. The method of claim 35, wherein said size of nucleic acid molecules or fragments thereof are determined by optical mapping.

42. A method of determining which microorganism is present in a biological sample which contains a microorganism wherein said method comprises the steps of:

(a) concentrating said microorganism according to yield concentrated microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region, wherein (i) an inner diameter of said middle region is larger than an inner diameter of said lower region or (ii) the inner diameter of said middle region is the same as the inner diameter of said lower region, wherein that inner diameter is small enough to trap an air bubble between two layers of aqueous liquid such that the air bubble will keep said two layers of aqueous liquid separate so long as said centrifuge tube is at rest, and wherein said lower region has a closed bottom;

(b) extracting nucleic acid from said concentrated microorganism;

(c) incubating said nucleic acid with restriction enzymes to produce nucleic acid fragments;

(d) staining said nucleic acid or nucleic acid fragments;

(e) determining a pattern of sizes of said nucleic acid fragments; and

(f) comparing said pattern of sizes with patterns of sizes of nucleic acids, digested with said restriction enzymes, obtained from known microorganisms,

wherein said microorganism in said biological sample is identified as a microorganism which has an identical restriction fragment pattern.

43. The method of claim 42, wherein said sizes of nucleic acid molecules or fragments thereof are determined using flow cytometry.

44. The method of claim 42, wherein said sizes of nucleic acid molecules or fragments thereof are determined by gel electrophoresis.

45. The method of claim 42, wherein said sizes of nucleic acid molecules or fragments thereof are determined by mass spectrometry.

46. The method of claim 42, wherein said size of nucleic acid molecules or fragments thereof are determined by optical mapping.

47. A method of determining which microorganism is present in a biological sample which contains a microorganism wherein said method comprises the steps of:

(a) concentrating said microorganism according to yield concentrated microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein said centrifuge tube comprises a linearly continuous inner surface at least partially defined by said upper, middle and lower regions, wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner diameter of said lower region and wherein said lower region has a closed bottom;

(b) extracting nucleic acid from said concentrated microorganism;

(c) incubating said nucleic acid with restriction enzymes to produce nucleic acid fragments;

(d) staining said nucleic acid or nucleic acid fragments;

(e) determining a pattern of sizes of said nucleic acid fragments; and

(f) comparing said pattern of sizes with patterns of sizes of nucleic acids, digested with said restriction enzymes, obtained from known microorganisms,

wherein said microorganism in said biological sample is identified as a microorganism which has an identical restriction fragment pattern.

48. The ultracentrifuge tube of claim 47, wherein said middle region comprises one or more serrations.

49. The ultracentifuge tube of claim 47, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

50. The method of claim 47, wherein said sizes of nucleic acid molecules or fragments thereof are determined using flow cytometry.

51. The method of claim 47, wherein said sizes of nucleic acid molecules or fragments thereof are determined by gel electrophoresis.

52. The method of claim 47, wherein said sizes of nucleic acid molecules or fragments thereof are determined by mass spectrometry.

53. The method of claim 47, wherein said size of nucleic acid molecules or fragments thereof are determined by optical mapping.

54. A method of determining which microorganism is present in a biological sample which contains a microorganism wherein said method comprises the steps of:

(a) concentrating said microorganism according to yield concentrated microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner diameter of said lower region, wherein said upper region is separated from said middle region by a first tapering region having a decreasing diameter from said upper region toward said middle region, and said middle region is separated from said lower region by a second tapering region having a decreasing diameter from said middle region toward said lower region;

(b) extracting nucleic acid from said concentrated microorganism;

(c) incubating said nucleic acid with restriction enzymes to produce nucleic acid fragments;

(d) staining said nucleic acid or nucleic acid fragments;

(e) determining a pattern of sizes of said nucleic acid fragments; and

(f) comparing said pattern of sizes with patterns of sizes of nucleic acids, digested with said restriction enzymes, obtained from known microorganisms,

wherein said microorganism in said biological sample is identified as a microorganism which has an identical restriction fragment pattern.

55. The ultracentrifuge tube of claim 54, wherein said middle region comprises one or more serrations.

56. The ultracentifuge tube of claim 54, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

57. The method of claim 54, wherein said sizes of nucleic acid molecules or fragments thereof are determined using flow cytometry.

58. The method of claim 54, wherein said sizes of nucleic acid molecules or fragments thereof are determined by gel electrophoresis.

59. The method of claim 54, wherein said sizes of nucleic acid molecules or fragments thereof are determined by mass spectrometry.

60. The method of claim 54, wherein said size of nucleic acid molecules or fragments thereof are determined by optical mapping.

61. A method of identifying a microorganism in a biological sample, wherein said method comprises the steps of:

(a)concentrating said microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to

concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein an inner diameter of said upper region is larger than an inner diameter of said lower region, wherein said upper region is separated from said lower region by said middle region having a decreasing diameter from said upper region toward said lower region and wherein said lower region has a closed bottom; and

(b) incubating with antibodies specific for known microorganisms,

wherein if said antibodies bind to said concentrated microorganism then said microorganism is identified as the microorganism to which the antibodies are known to bind, by their fluorescence.

62. The ultracentrifuge tube of claim 61, wherein said middle region comprises one or more serrations.

63. The ultracentifuge tube of claim 61, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

64. The method of claim 61, wherein said fluorescent antibodies are present in said upper region of said centrifuge tube during centrifugation of said biological sample, attach to the microorganism for which they are specific during incubation, cosediment and coband with said microorganism, and are detected by the fluorescence of said antibody-microorganism conjugate band.

65. The method of claim 64, wherein a plurality of species of antibody is present in said upper region of said centrifuge tube during centrifugation of said biological sample and wherein each species of antibody is labeled with a marker distinct from any marker on any other species of antibody present in said upper region.

66. The method of claim 61, in which the antibody microorganism complex has a banding density different from that of the free microorganism, thus allowing the presence of the complex to be detected.

67. A method of identifying a microorganism in a biological sample, wherein said method comprises the steps of:

(a)concentrating said microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region, wherein (i) an inner diameter of said middle region is larger than an inner diameter of said lower region or (ii) the inner diameter of said middle region is the same as the inner diameter of said lower region, wherein that inner diameter is small enough to trap an air bubble between two layers of aqueous liquid such that the air bubble will keep said two layers of aqueous liquid separate so long as said centrifuge tube is at rest, and wherein said lower region has a closed bottom; and

(b) incubating with antibodies specific for known microorganisms,

wherein if said antibodies bind to said concentrated microorganism then said microorganism is identified as the microorganism to which the antibodies are known to bind, by their fluorescence.

68. The method of claim 67, wherein said fluorescent antibodies are present in said upper region of said centrifuge tube during centrifugation of said biological sample, attach to the microorganism for which they are specific during incubation, cosediment and coband with said microorganism, and are detected by the fluorescence of said antibody-microorganism conjugate band.

69. The method of claim 68, wherein a plurality of species of antibody is present in said upper region of said centrifuge tube during centrifugation of said biological sample and wherein each species of antibody is labeled with a marker distinct from any marker on any other species of antibody present in said upper region.

70. The method of claim 67, in which the antibody microorganism complex has a banding density different from that of the free microorganism, thus allowing the presence of the complex to be detected.

71. A method of identifying a microorganism in a biological sample, wherein said method comprises the steps of:

(a)concentrating said microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region, wherein said centrifuge tube comprises a linearly continuous inner surface at least partially defined by said upper, middle and lower regions, wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner diameter of said lower region and wherein said lower region has a closed bottom; and

(b) incubating with antibodies specific for known microorganisms,

wherein if said antibodies bind to said concentrated microorganism then said microorganism is identified as the microorganism to which the antibodies are known to bind, by their fluorescence.

72. The ultracentrifuge tube of claim 71, wherein said middle region comprises one or more serrations.

73. The ultracentifuge tube of claim 71, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

74. The method of claim 71, wherein said fluorescent antibodies are present in said upper region of said centrifuge tube during centrifugation of said biological sample, attach to the microorganism for which they are specific during incubation, cosediment and coband with said microorganism, and are detected by the fluorescence of said antibody-microorganism conjugate band.

75. The method of claim 74, wherein a plurality of species of antibody is present in said upper region of said centrifuge tube during centrifugation of said biological sample and wherein each species of antibody is labeled with a marker distinct from any marker on any other species of antibody present in said upper region.

76. The method of claim 71, in which the antibody microorganism complex has a banding density different from that of the free microorganism, thus allowing the presence of the complex to be detected.

77. A method of identifying a microorganism in a biological sample, wherein said method comprises the steps of:

(a)concentrating said microorganism by i) adding a sample containing said microorganism to an ultracentrifuge tube and ii) centrifuging said sample in said tube to concentrate said microorganism, said ultracentrifuge tube comprising an upper region, a middle region and a lower region wherein an inner diameter of said upper region is larger than an inner diameter of said middle region and wherein an inner diameter of said middle region is larger than an inner diameter of said lower region, wherein said upper region is separated from said middle region by a first tapering region having a decreasing diameter from said upper region toward said middle region, and said middle region is separated from said lower region by a second tapering region having a decreasing diameter from said middle region toward said lower region; and

(b) incubating with antibodies specific for known microorganisms,

wherein if said antibodies bind to said concentrated microorganism then said microorganism is identified as the microorganism to which the antibodies are known to bind, by their fluorescence.

78. The ultracentrifuge tube of claim 77, wherein said middle region comprises one or more serrations.

79. The ultracentifuge tube of claim 77, wherein said lower region has an inner diameter small enough to trap an air bubble between two layers of liquid such that the air bubble will keep said two layers of liquid separate so long as said centrifuge tube is at rest.

80. The method of claim 77, wherein said fluorescent antibodies are present in said upper region of said centrifuge tube during centrifugation of said biological sample, attach to the microorganism for which they are specific during incubation, cosediment and coband with

said microorganism, and are detected by the fluorescence of said antibody-microorganism conjugate band.

81. The method of claim 80, wherein a plurality of species of antibody is present in said upper region of said centrifuge tube during centrifugation of said biological sample and wherein each species of antibody is labeled with a marker distinct from any marker on any other species of antibody present in said upper region.

82. The method of claim 77, in which the antibody microorganism complex has a banding density different from that of the free microorganism, thus allowing the presence of the complex to be detected.